



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,078	02/21/2002	Adam E. Norton	SEN-020	2338
28584	7590	10/14/2005		
STALLMAN & POLLOCK LLP SUITE 2200 353 SACRAMENTO STREET SAN FRANCISCO, CA 94111			EXAMINER CHANG, AUDREY Y	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 10/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/081,078

Applicant(s)

NORTON, ADAM E.

Examiner

Audrey Y. Chang

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 27-30 and 33-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-30 and 33-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Remark*

- This Office Action is in response to applicant's amendment filed on August 2, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 27-30, 43 and 44 and has newly added claims 47-50.
- Claims 27-30, and 33-50 remain pending in this application.

### *Response to Amendment*

1. The amendment filed **August 2, 2005** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material, which is not supported by the original disclosure, is as follows: **claims 27-30, 43 and 44 and newly added claims 47-50** recite the phrase "having substantially similar birefringent properties". The specification teaches specifically that in order for the specific thickness ratios and the polarization orientation axes recited in the claims to make the birefringent plates to provide depolarization, the birefringent plates have to be identical and which means the birefringent properties have to be "identical" not "*substantially similar*". The phrase "*similar*" as defined in dictionary means "resembling through not completely identical". This phrase therefore is NOT supported by the specification disclosure.

Applicant is required to cancel the new matter in the reply to this Office Action.

2. The amendment filed on **January 24, 2005** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the amended claims 27-28, 39-42 and newly submitted claims 45-46 recited the

Art Unit: 2872

feature “a permutation thereof”. The specification only gives the support for the thickness ratios of 1:3:9 and 4:3:9 but not other “permutations” explicitly.

Applicant is required to cancel the new matter in the reply to this Office Action. (This rejection is repeated from the previous Office Action).

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 27-30 and 33-50 are rejected** under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on the newly added matters are set forth in the paragraph above.

5. **Claims 27-30 and 33-46 are rejected** under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection, concerning the new matters phrase “*a permutation*”, have been set forth in the previous Office Action. The disclosure of “some permutations” is not the direct support for “a permutation” since “some” means a *selection* of a group of permutations yet “a permutation” referred to **any one** of the permutations in the group which could be the one that is not supported by the “some of”.

Art Unit: 2872

Also since the specification *fails* to teach **what exactly** are these “some permutations” , the specification therefore fails to provide the enablement for achieving the claimed “some permutations”. The only actual ratios of the thickness concerning the birefringent plates disclosed in the specification are 1:3:9 and 4:3:9, however they are not permutations to each other.

6. **Claims 27-30 and 33-50 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the **enablement** requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims fail to teach how could three birefringent plates with certain thickness or thickness ratios or certain angles between polarization axes of the plates will make the three birefringent plates a “*depolarizer*”. The depolarization is a result of the certain combination of the “retardance frequency” of the birefringent plates. The retardance is a function of the *thickness* but is also more importantly a function of the *refractive indices* in the ordinary and extraordinary directions of the birefringent plates. The retardance frequency ratio of the plates is the essential factor for the depolarization function. And only if the plates are of the *same material* then the retardance ratio becomes the *thickness* ratio. The thickness of the plates therefore will not make the plates “depolarization”. Simply by reciting the relative angle of axes of the birefringent plates also does not make the plates “depolarizer”. The amended phrase of “substantially similar birefringent properties” actually discloses away from the needed criterion since the term “similar” really means “*not identical*”.

#### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2872

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**8. Claims 27-28 and 33-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hakimi (US Pat. No. 5,432,637).**

With regard to claims 27 and 28, **Hakimi** discloses the invention as claimed—[a] depolarizer [see Fig. 1] with three birefringent plates [see, e.g., col. 4, ll. 46-56: i.e., claim 2]—**EXCEPT FOR** explicit teachings of the respectively recited thickness ratios or a permutation thereof. **Hakimi** does however disclose three birefringent plates nearly satisfying the 1:3:9 thickness ratio recitation and does teach the birefringent plates have the condition such as the proper retardance frequency combination and relative angle between the polarization axes. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of **Hakimi** such that its three birefringent plates have the thickness ratios, (and therefore retardance frequency combinations), respectively recited in these claims, for at least the purpose of optimizing a depolarizing effect, the reference clearly disclosing the teaching of three birefringent plates having different thicknesses relative to one another, because it has been held that discovering optimum values of result-effective variables involves only routine skill in the art. *In re Boesch*, 617 F.2d, 205 USPQ 215 (CCPA 1980).

**Claims 27, 28 43 and 44 have been amended** to include the features of the birefringent plates having “substantially similar birefringent properties”. This feature is rejected under 35 USC 112, first paragraph, for the reasons stated above. **Hakimi** teaches that the birefringent plates may comprise quartz plate, (please see column 4, line 15).

With regard to claims 33 & 34, it is asserted that the relative thicknesses taught by **Hakimi** further are such that at least one retardance frequency would vanish in a first quadrant.

**With regard to claim 35, Hakimi** explicitly teaches where the thicknesses of the three plates are selected such that the plate of intermediate thickness is positioned between the two remaining plates. *See* Fig. 1.

**With regard to claim 36,** the teachings set out in the **Hakimi** reference implicitly, if not explicitly, encompass an arrangement of said three plates where the thicknesses of the three plates are selected such that the plate of least thickness is positioned between the remaining two plates. *See, e.g.,* claims 1 and 2, in which the order in which said at least three plates are arranged is not limited to the exemplary ordering between same that is depicted in Fig. 1.

**With regard to claims 37 & 38, Hakimi** explicitly discloses wherein each of the birefringent plates has an ordinary axis, each birefringent plate having a substantially different rotation angle of the respective ordinary axis. Cf. 6 to 10 and 10 to 14 in Fig. 1.

**With regard to claims 39-42, 45, and 46,** please refer to comments made above regarding the rejection of like limitations recited in claims 27 and 28.

**With regard to claims 43 and 44, Hakimi** discloses the claimed depolarizer **EXCEPT FOR** explicit teachings wherein, with specific reference to claim 43, the respective thicknesses of the plates are 1.5 mm, 1.125 mm, and 3.375 mm; and with specific reference to claim 44, where the total thicknesses of the plates is approximately 6 mm. Notwithstanding this observation, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have constituted said depolarizer such that, in the case of claim 43, the respective thicknesses of the plates be 1.5 mm, 1.125 mm, and 3.375 mm, and in the case of claim 44, the total thicknesses of the plates is approximately 6 mm, for at least the purpose of enabling sufficient depolarization to take place, because it has been held not only that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233 (CCPA 1955)), but also

Art Unit: 2872

that discovering an optimum value of a result-effective variable—total thickness, in this instance— involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

**9. Claims 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hakimi in view of the Optics (Hecht and Zajac, pages 246-249).**

**Hakimi** teaches a *depolarizer* that is formed by having a *plurality of at least three contiguous linear birefringent elements* arranged in successions, (please see Figure 1, column 4, lines 49-50).

Hakimi teaches that the birefringent plates can be made of *quartz crystal* with crystal axes oriented in specific relationships. **Hakimi** also teaches specifically that in order to destroy the phase coherence of an input optical radiation, (i.e. to provide depolarization effect to the input optical radiation), the length or *thickness* of *each of* the birefringent elements has to be selected so that the polarization mode or phase delays in the birefringent element exceeds the coherent time of the light, (please see column 3, lines 38-52). This reference however does not teach explicitly that the thickness of the birefringent plates have the explicit thickness ratios as claimed in the claims. However as explicitly taught by Hecht and Zajac the polarization phase delay for a birefringent crystal is defined by  $(2\pi/\lambda) * d(|n_o - n_e|)$ , wherein  $n_o$  is the refractive index for the ordinary ray and the  $n_e$  is the refractive index for the extraordinary ray propagating in the crystal, and “d” being the thickness of the crystal, this means the polarization phase delay is closely determined by the *thickness* of the crystal. It would then have been obvious to one skilled in the art to modify the thickness of the plates to have the thickness ratios to make the plates have the criterion to destroy the phase coherence of the input optical radiation to provide the optimized depolarization effect. It is also true that since the thickness of the plate determines the polarization phase delay of each plate, the depolarizer of Hakimi having the three birefringent plates must have a thickness satisfies the ratio, (if the ratio is the critical factor for achieving depolarization function) in order for the plates to provide depolarization function.



***Allowable Subject Matter***

10. The following is a statement of reasons for the indication of allowable subject matter: of the prior art references considered none has disclosed a depolarizer that is comprised of three birefringent plates of the *same* birefringent materials having thickness ration of either 1:3:9 or 4:3:9 and such that the first angle between polarization axes of a first adjacent pair of the plates is substantially  $\left(n + \frac{1}{2}\right)\frac{\pi}{2}$ , and a second angle between polarization axes of a second adjacent pair of the plates is substantially  $n\frac{\pi}{2} \pm \arccos(-1/3)/4$ , where n is an integer.

***Response to Arguments***

11. Applicant's arguments filed August 2, 2005 have been fully considered but they are not persuasive.

In response to applicant's arguments which stated that the cited Hakimi reference does not teach explicitly about the thickness ratios of the plates to be of the cited ratio and a permutation of the ratio, which therefore differs from the instant application, the examiner respectfully disagrees for the reasons stated the below. **Firstly** since the application never *explicitly teaches* what exactly are these "a permutation" referred to, one cannot say if the plates of cited Hakimi reference have a thickness ratio that is different from the so-called "a permutation". **Secondly**, it is standard knowledge in the art that the polarization phase delay in a birefringent crystal is mainly determined by the *thickness* of the plates (please see any standard optic textbook, such as Hecht and Zajac), and the cited Hakimi reference teach explicitly about the thickness requirement for each plate to destroy the phase coherence of the input optical radiation therefore provide depolarization effect, one skilled in the art will be able to find out the thickness for each plates to achieve such and to achieve the maximum depolarization effect.

Art Unit: 2872

As for claims 43-46, the *specification* of the instant application **fails** to teach by having three birefringent plates with “similar birefringent properties” and the specific thickness will be able to provide depolarization.

### ***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

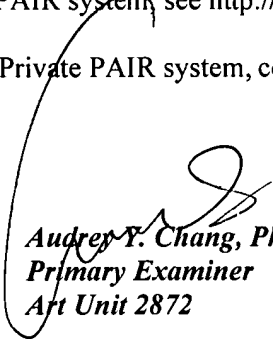
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2872

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



*Audrey Y. Chang, Ph.D.*  
**Primary Examiner**  
**Art Unit 2872**

A. Chang, Ph.D.